BC hydro

Environmental Planning and Assessment Report

Proposed Circuit 2L39 and 2L40 Underground Cable Replacement between Newell Substation and Hill Avenue Terminal Station

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Proposed Circuit 2L39 and 2L40 Underground Cable Replacement between Newell Substation and Hill Avenue Terminal Station

Environmental Planning and Assessment Report

March 2000

PROPOSED CIRCUIT 2L39 AND 2L40 UNDERGROUND CABLE REPLACEMENT BETWEEN NEWELL SUBSTATION AND HILL TERMINAL STATION ENVIRONMENTAL PLANNING AND ASSESSMENT REPORT

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1. INTRODUCTION

The proposed underground cable replacement of Circuits 2L39 and 2L40 consists of two components. The station component involves the replacement of the two terminal structures located near Burnaby Lake, north of the Trans Canada Highway. The transmission component involves the replacement of the underground cables that run between the Hill Avenue Terminal Station and Newell Substation located at the corner of Griffiths Street and Kingsway. While the project is being driven by the need to replace the deteriorated underground cables between the Hill Avenue Terminal Station and Newell Substation, it is prudent to rebuild the Hill Avenue Terminal Station at the same time to make it more seismically stable. Alternative routes for the new cables were not considered since is intended to use the existing ductbank system. The use of the existing right-of-way clearly has the least aesthetic, environmental, and construction impacts on the community, Burnaby Lake Park users, and other stakeholders.

This report identifies the impacts that the project will have on the biophysical and social environment within the area bounded by the project. Impacts will arise primarily from the construction activity. The footprint of the new terminal station is going to be smaller than the combined area of the existing stations and will not result in any long-term changes to the environment. In fact, the improved oil containment facilities being added to the new terminal station represent a reduction in the risk of environmental damage over the long-term.

2. BACKGROUND

2.1 STUDY AREA

Burnaby Lake and the land immediately surrounding the lake constitute Burnaby Regional Park. The lake itself accounts for about half of the total 300 hectares that make up the park. The park is managed by the Greater Vancouver Regional District (GVRD). The land component consists primarily of peat bogs, marsh and mixed (primarily deciduous) forest. The lake is shallow and eutrophic with considerable ingress of vegetation.

Surrounding the park is the Trans Canada Highway to the south, industrial land to the north and west and residential /industrial land to the east. The Brunette River drains the lake, from the north-east. A number of small streams are tributary to the lake, including Still Creek from the north-west and Robert Burnaby Creek from the south-east.

The underground portions of the transmission circuits are directed south from the Burnaby Lake area, across the Trans Canada Highway and along a B.C. Hydro right-of-way. This right-of-way runs through Robert Burnaby Park and the neighbourhoods adjacent to Canada Way and Imperial Avenue, to Newell Substation. North of Canada Way the right-of-way passes adjacent to the Lakeview Elementary school. After paralleling Imperial Avenue the underground circuits diverge and one follows Griffiths Avenue to enter Newell Substation on the east-side of the station. The other underground circuit continues in the right-of way and enters the substation on the north side.

2.2 EXISTING FACILITIES

Circuits 2L39 and 2L40 are comprised of wood-pole and lattice steel tower transmission lines until they get to the Hill Avenue Terminal Station area, where they change to underground cables for about 3.3 kilometres to Newell Substation. The underground cables, which were installed in the 1950s, are severely deteriorated and their protective metal sheaths have corroded, resulting in oil-leaks into the ductbank system. To date, all of the oil leaks have been contained within the ductbank system; however, the repairs have become more frequent and the oil-leaks are a potential environmental concern.

In the event of an oil leak, the oil is contained in the ducts and flows to the nearest manhole where it can be mopped up with sorbent material. Beyond the last manhole, and to collect oil in the event of an oil-leak from the terminal structures, oil is collected into a drainage system around the perimeter of each terminal compound. This collection system drains into a concrete sump which is accessible to large vehicles and collected oil can be pumped out into a truck for disposal.

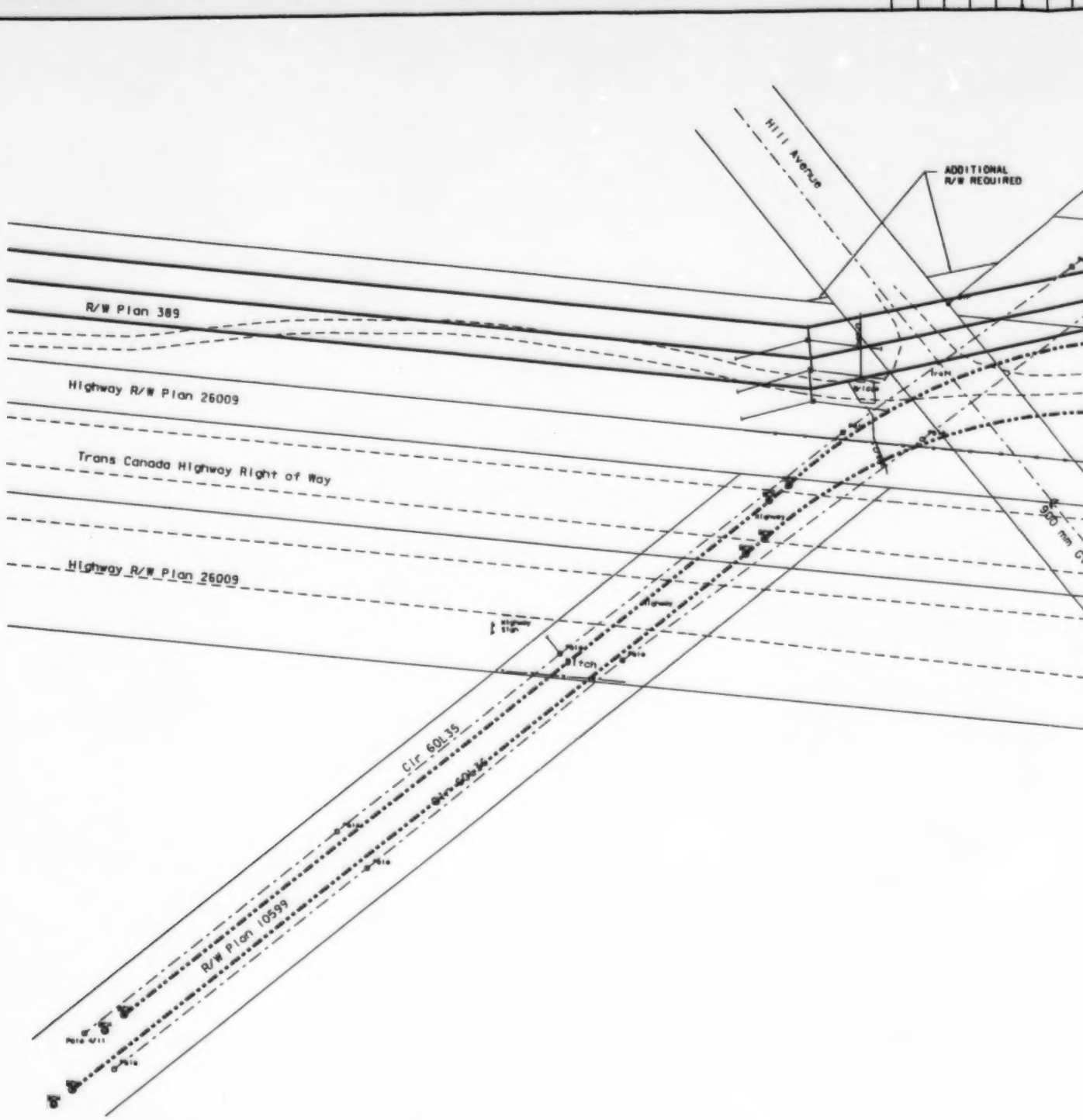
2.3 SELECTION OF PROPOSED ALTERNATIVES FOR THE HILL AVENUE TERMINAL STATION

To facilitate the transition from an overhead to an underground system the overhead transmission lines are connected to the underground transmission cables at the Hill Avenue Terminal Station, located at the south-east end of Burnaby Lake, north of the Trans Canada Highway. Because the terminal stations are sited on poorly drained wetland peat and silt/clay soils they are considered to be seismically unstable and must be upgraded. In order to meet the latest B.C. Hydro Seismic Performance Criteria for new construction, five potential sites for relocation of the terminal stations were identified. The evaluated sites are shown on the attached plans and described below.

Option 1: The terminal station site would be located about 100 metres west of the existing location, and the terminals for the individual circuits would be closer together than they are now. Overhead Circuits 2L40 and 2L50 would need to be reconfigured to accommodate this arrangement. This option would require some realignment of the ductbank section north of the Trans Canada Highway.

Option 2: The new terminals would be located slightly east from their current locations. In this option alignment of overhead Circuits 2L40 and 2L50 remains unchanged and the last section of the ductbanks into the terminal station sites would be realigned.

Option 3: The new terminals would be located about 50 metres west of the existing terminals and the two circuits would be located closer together. As with Option 1, the alignment of overhead Circuits 2L40 and 2L50 would need to be changed to facilitate this more compact site configuration. The alignment would require new ducts under the Trans Canada Highway.



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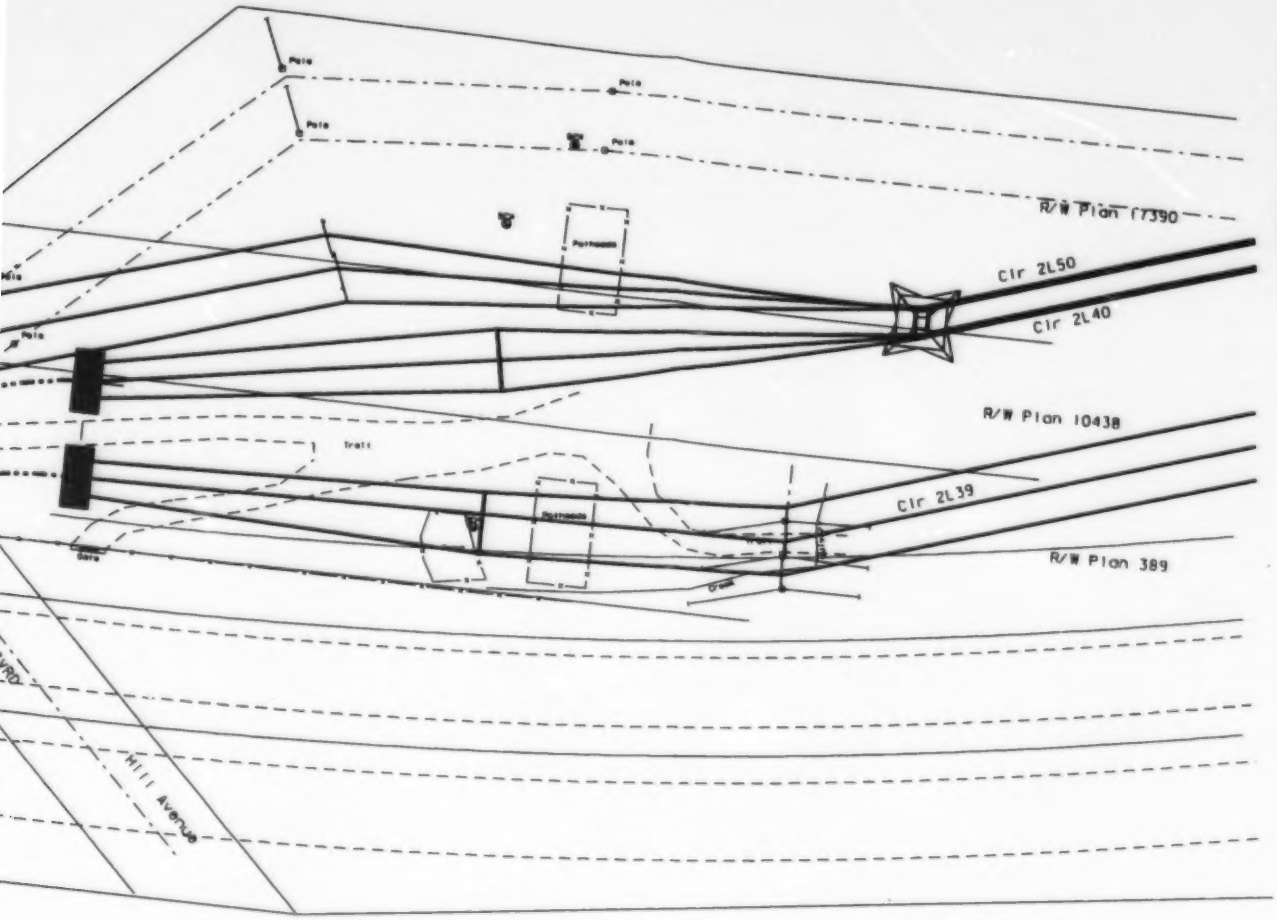

NOTES:

1. DESCRIPTION: NEW POTHEAD SITE LOCATED WEST OF EXISTING POTHEADS IN VICINITY OF EXISTING 60 KV TRANSMISSION LINES CROSSING OF HIGHWAY.
2. ADDITIONAL RIGHT-OF-WAY IS REQUIRED NORTH OF EXISTING RIGHT-OF-WAY AT HILL AVE. AT INTERSECTION WITH PRESENT BCHYDRO RIGHT-OF-WAY. .
3. ADDITIONAL WOOD POLE STRUCTURES NEED TO CARRY OVERHEAD LINES.
4. EXISTING CABLE DUCTS CAN BE UTILIZED - IF FOUND IN GOOD CONDITION.
5. ACCESS EITHER ALONG TRAIL FROM WEST OR OFF OF HIGHWAY - ACCESS FROM THE WEST WILL HAVE TO TAKE INTO CONSIDERATION THE CREEK AND GVRD WATER MAIN CROSSINGS.
6. GROUND IMPROVEMENT AT POTHEAD SITE FOR SEISMIC RISK REQUIRED - MAY AFFECT NEARBY CREEK AND GVRD WATER MAIN.
7. SEISMIC RISK EXISTS FOR EXISTING CABLE DUCTS UNDER HIGHWAY.

LEGEND:

- B. C. HYDRO MANHOLE
- PROPOSED CABLE POTHEAD SITE
- OVERHEAD 230 kV LINES
- UNDERGROUND 230 kV CABLES

PRELIMINARY

	DATE	REVISIONS	DRAFT CHKD	DFTG	DFTG CHKD	ENGRG	REV	APPT

REVISIONS

DSGN
DRAFT CHKD
DFTG
DFTG CHKD
ENGRG
REV
APPT

DATE

KLMC CODE 2.07 /

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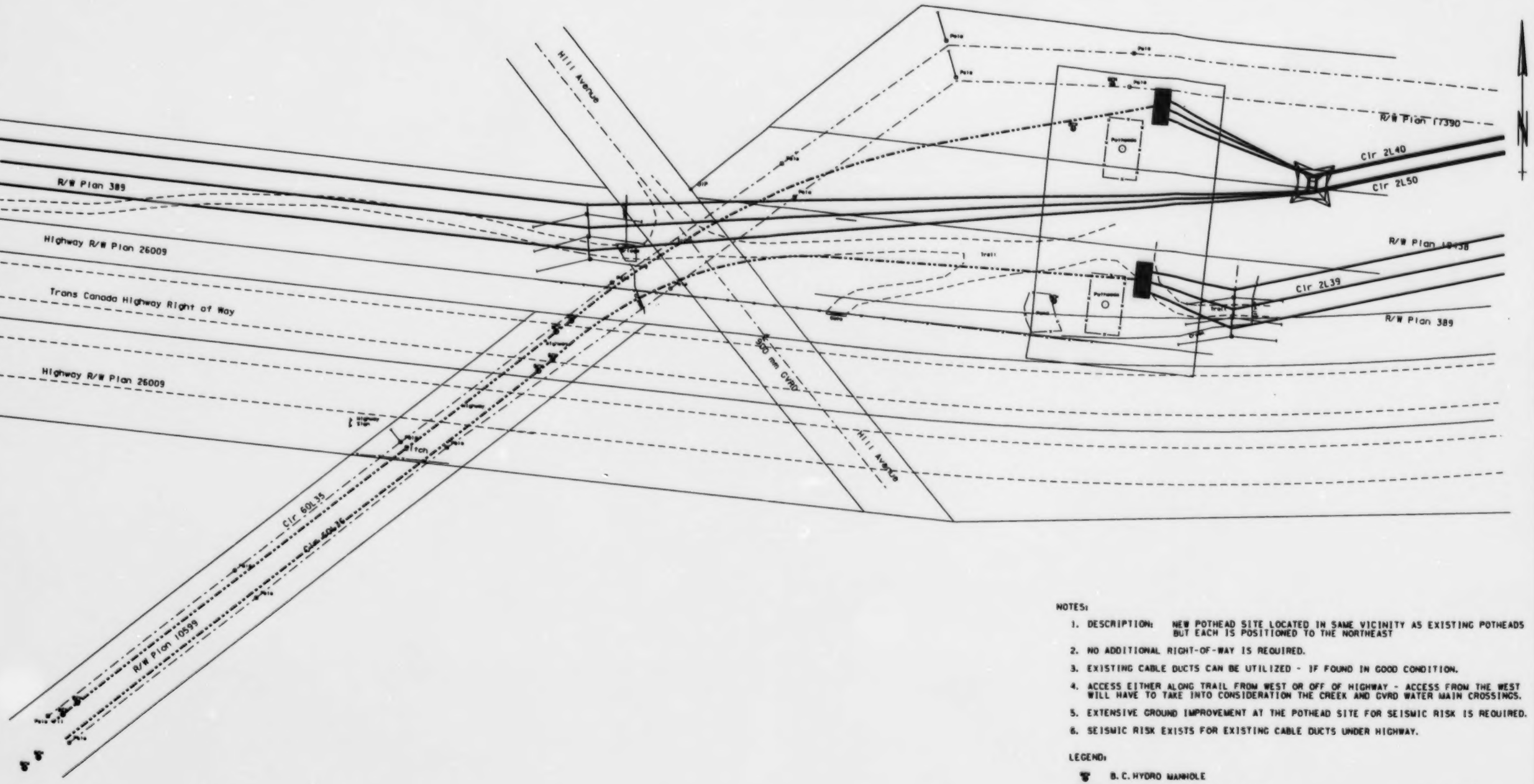
HILL AVENUE TERMINATION STATION

CIRCUITS 2L39 AND 2L40
OPTION 1
SITE PLAN

A | DWG NO CAD | R



NOTES:

1. DESCRIPTION: NEW POTHEAD SITE LOCATED IN SAME VICINITY AS EXISTING POTHEADS BUT EACH IS POSITIONED TO THE NORTHEAST
2. NO ADDITIONAL RIGHT-OF-WAY IS REQUIRED.
3. EXISTING CABLE DUCTS CAN BE UTILIZED - IF FOUND IN GOOD CONDITION.
4. ACCESS EITHER ALONG TRAIL FROM WEST OR OFF OF HIGHWAY - ACCESS FROM THE WEST WILL HAVE TO TAKE INTO CONSIDERATION THE CREEK AND CVRD WATER MAIN CROSSINGS.
5. EXTENSIVE GROUND IMPROVEMENT AT THE POTHEAD SITE FOR SEISMIC RISK IS REQUIRED.
6. SEISMIC RISK EXISTS FOR EXISTING CABLE DUCTS UNDER HIGHWAY.

LEGEND:

- B.C. HYDRO MANHOLE
- PROPOSED CABLE POTHEAD SITE
- OVERHEAD 230 kV LINES
- UNDERGROUND 230 kV CABLES

PRELIMINARY

REFERENCE DRAWINGS

NO.	DRAWING NUMBER	TITLE

REVISIONS

NO.	DESCRIPTION	DATE	DESIGNED	DRAWN	CHKD	APPD

B.C. Hydro

HILL AVENUE TERMINATION STATION

CIRCUITS 2L39 AND 2L40
OPTION 2
SITE PLAN

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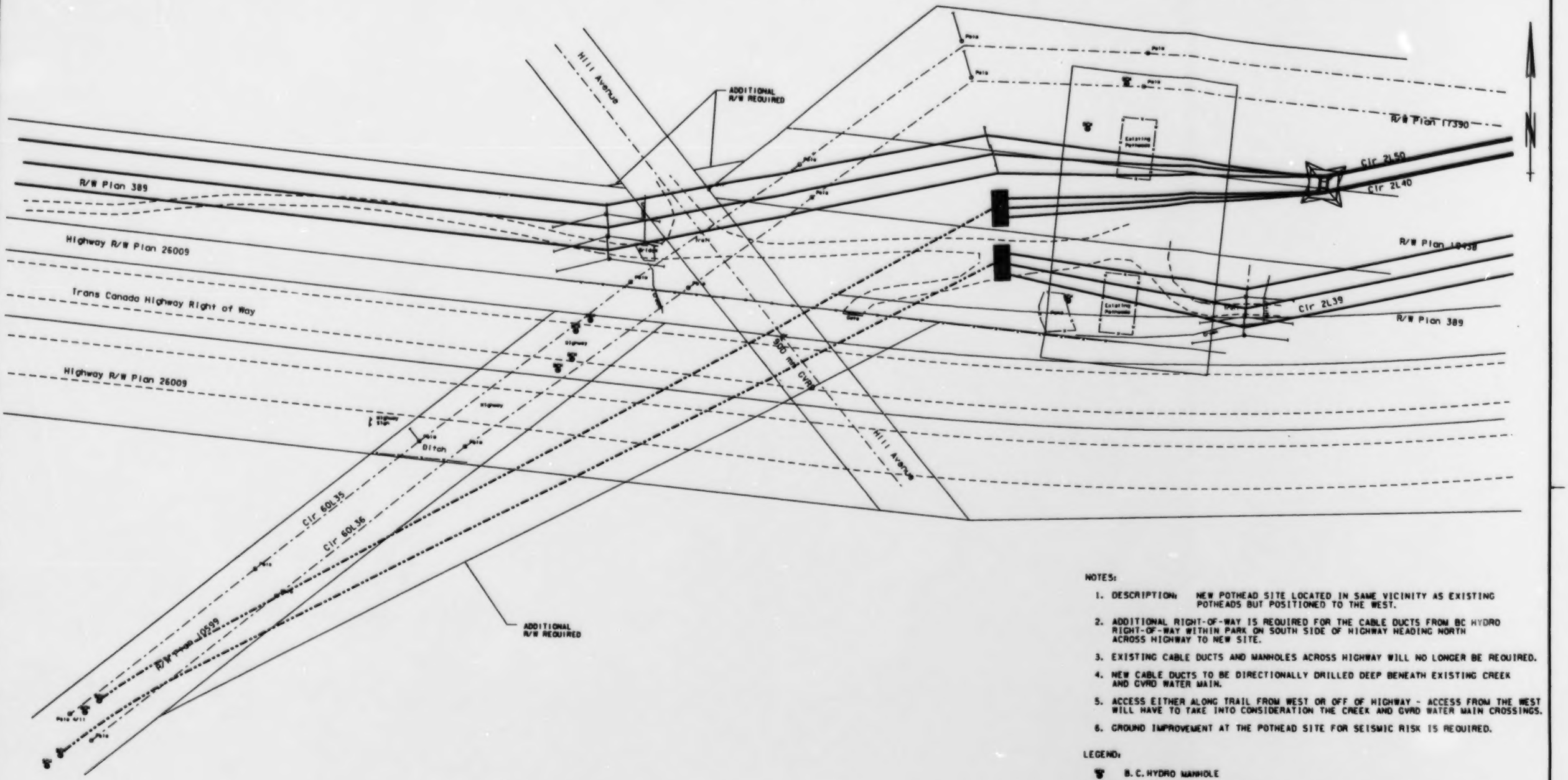

NOTES:

1. DESCRIPTION: NEW POTHEAD SITE LOCATED IN SAME VICINITY AS EXISTING POTHEADS BUT POSITIONED TO THE WEST.
2. ADDITIONAL RIGHT-OF-WAY IS REQUIRED FOR THE CABLE DUCTS FROM BC HYDRO RIGHT-OF-WAY WITHIN PARK ON SOUTH SIDE OF HIGHWAY HEADING NORTH ACROSS HIGHWAY TO NEW SITE.
3. EXISTING CABLE DUCTS AND MANHOLES ACROSS HIGHWAY WILL NO LONGER BE REQUIRED.
4. NEW CABLE DUCTS TO BE DIRECTIONALLY DRILLED DEEP BENEATH EXISTING CREEK AND GVRD WATER MAIN.
5. ACCESS EITHER ALONG TRAIL FROM WEST OR OFF OF HIGHWAY - ACCESS FROM THE WEST WILL HAVE TO TAKE INTO CONSIDERATION THE CREEK AND GVRD WATER MAIN CROSSINGS.
6. GROUND IMPROVEMENT AT THE POTHEAD SITE FOR SEISMIC RISK IS REQUIRED.

LEGEND:

- B. C. HYDRO MANHOLE
- PROPOSED CABLE POTHEAD SITE
- OVERHEAD 230 kV LINES
- UNDERGROUND 230 kV CABLES

PRELIMINARY

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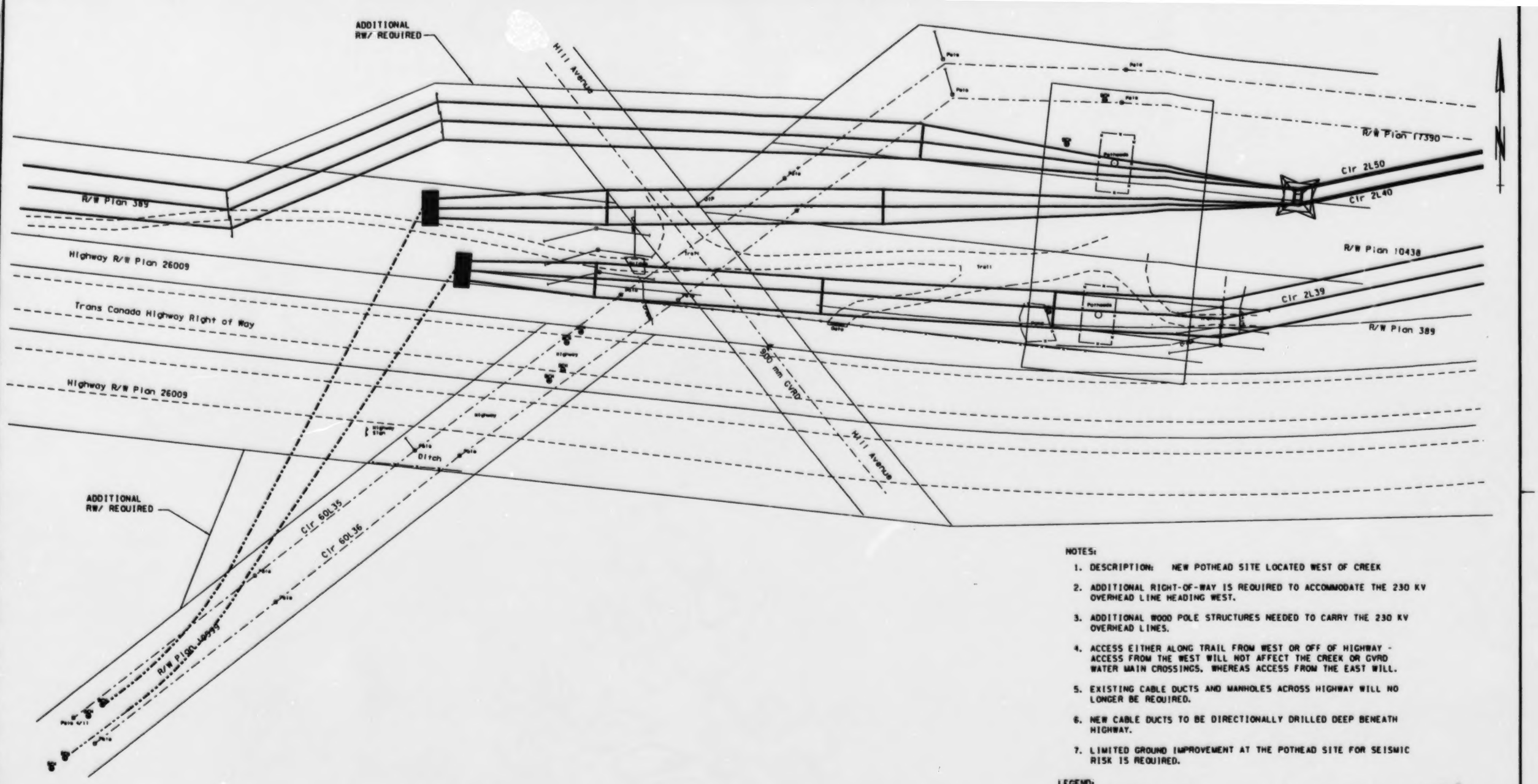
HILL AVENUE TERMINATION STATION

CIRCUITS 2L39 AND 2L40
OPTION 3
SITE PLAN

REFERENCE DRAWINGS | REVISIONS | DWG NO CAD | A



NOTES:

1. DESCRIPTION: NEW POTHEAD SITE LOCATED WEST OF CREEK
2. ADDITIONAL RIGHT-OF-WAY IS REQUIRED TO ACCOMMODATE THE 230 KV OVERHEAD LINE HEADING WEST.
3. ADDITIONAL WOOD POLE STRUCTURES NEEDED TO CARRY THE 230 KV OVERHEAD LINES.
4. ACCESS EITHER ALONG TRAIL FROM WEST OR OFF OF HIGHWAY - ACCESS FROM THE WEST WILL NOT AFFECT THE CREEK OR GVRD WATER MAIN CROSSINGS, WHEREAS ACCESS FROM THE EAST WILL.
5. EXISTING CABLE DUCTS AND MANHOLES ACROSS HIGHWAY WILL NO LONGER BE REQUIRED.
6. NEW CABLE DUCTS TO BE DIRECTIONALLY DRILLED DEEP BENEATH HIGHWAY.
7. LIMITED GROUND IMPROVEMENT AT THE POTHEAD SITE FOR SEISMIC RISK IS REQUIRED.

LEGEND:

- B. C. HYDRO MANHOLE
- PROPOSED CABLE POTHEAD SITE
- OVERHEAD 230 kV LINES
- UNDERGROUND 230 kV CABLES

PRELIMINARY

REFERENCE DRAWINGS

REF'S	DRAWING NUMBER	TITLE

REFERENCE DRAWINGS

REF'S	DRAWING NUMBER	TITLE

REVISIONS

#	NO	REMARKS	DATE	DESIGNED	DRAWN	CHKD	APP'D	REV	ADPT

DRG. CODE 2.07 /

BC Hydro

HILL AVENUE TERMINATION STATION

CIRCUITS 2L39 AND 2L40
OPTION 4
SITE PLAN

DATE

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CAD

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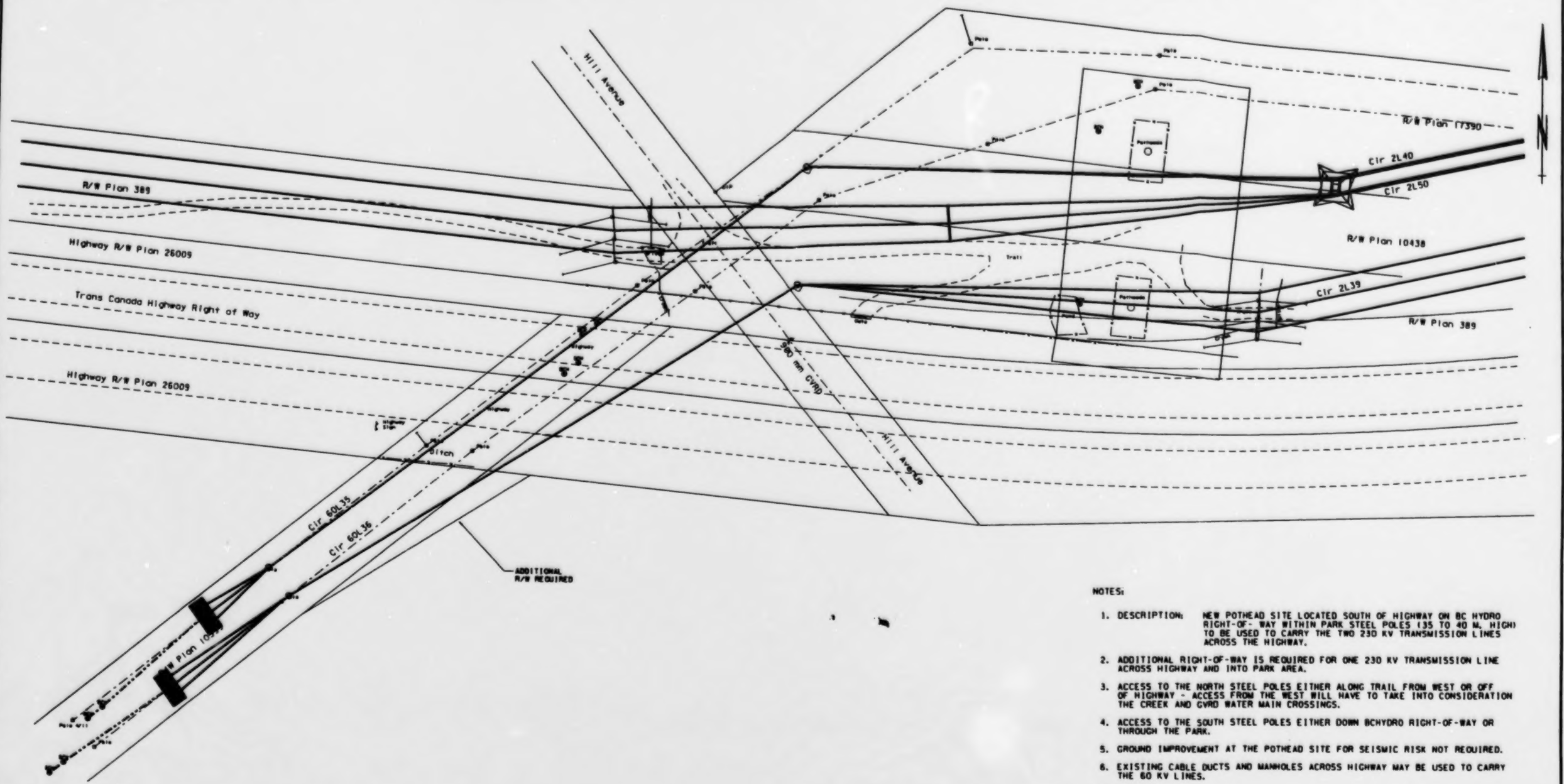

NOTES:

1. DESCRIPTION: NEW POTHEAD SITE LOCATED SOUTH OF HIGHWAY ON BC HYDRO RIGHT-OF- WAY WITHIN PARK STEEL POLES (35 TO 40 M. HIGH) TO BE USED TO CARRY THE TWO 230 KV TRANSMISSION LINES ACROSS THE HIGHWAY.
2. ADDITIONAL RIGHT-OF-WAY IS REQUIRED FOR ONE 230 KV TRANSMISSION LINE ACROSS HIGHWAY AND INTO PARK AREA.
3. ACCESS TO THE NORTH STEEL POLES EITHER ALONG TRAIL FROM WEST OR OFF OF HIGHWAY - ACCESS FROM THE WEST WILL HAVE TO TAKE INTO CONSIDERATION THE CREEK AND GVRD WATER MAIN CROSSINGS.
4. ACCESS TO THE SOUTH STEEL POLES EITHER DOWN BCHYDRO RIGHT-OF-WAY OR THROUGH THE PARK.
5. GROUND IMPROVEMENT AT THE POTHEAD SITE FOR SEISMIC RISK NOT REQUIRED.
6. EXISTING CABLE DUCTS AND MANHOLES ACROSS HIGHWAY MAY BE USED TO CARRY THE 60 KV LINES.

LEGEND:

- B.C. HYDRO MANHOLE
- PROPOSED CABLE POTHEAD SITE
- OVERHEAD 230 kV LINES
- UNDERGROUND 230 kV CABLES

PRELIMINARY

PLOT DATE 2.07 /

HILL AVENUE TERMINATION STATION

CIRCUITS 2L39 AND 2L40
OPTION 5
SITE PLAN

REFERENCE DRAWINGS

REVISIONS

Option 4: In this configuration the overhead portion of Circuits 2L39 and 2L40 is extended west along the existing right-of-way. The alignments for Circuits 2L40 and 2L50 are changed to allow for a more compact station footprint, and the new terminals are established about 200 metres west from the existing site. This option would require extensive additional right-of-way to accommodate the realignment of Circuit 2L50. As well, the underground portions of Circuits 2L39 and 2L40 would be realigned between the new terminal station site and the existing right-of-way in Robert Burnaby Park. This option may have a moderate impact on Robert Burnaby Creek depending on the exact location of the new terminal stations. The additional clearing, to the north to accommodate the new right-of-way for Circuit 2L50, would impact the Burnaby Lake Park.

Option 5: The new terminal structures would be located on the south side of the Trans Canada Highway within the existing right-of-way through Robert Burnaby Park. As a result, the overhead sections of Circuits 2L39 and 2L40 will cross the highway to the new terminal locations. Circuits 2L40 and 2L50 do not have to be realigned for this configuration. There will be significant visual and recreational impacts as a result of the overhead highway crossing and location of the terminals within the right-of-way in Robert Burnaby Park.

In consultation with the City of Burnaby, the GVRD, the Ministry of Transportation and Highways and the Ministry of Environment, Lands and Parks, a modified, more compact, Option 2 was selected as the alternative with the least impact on the environment, on parks users and on the viewscape (refer to Table C). The preferred configuration moves the two terminal stations closer together and realigns the last section of the ducts under the Trans Canada Highway and through Robert Burnaby Park. This arrangement, will reduce the overall footprint of the two stations, leaving a larger portion of the area between the highway and Burnaby Lake essentially unencumbered and available to park users.

2.4 PROJECT INFORMATION

The new compact terminal station will be constructed immediately east of the existing Circuit 2L39 terminals. Extensive ground improvement will be carried out in the area of the new substation to improve the seismic stability of the new facilities. As part of the project the existing terminals will be decommissioned and dismantled.

New cable ducts will be installed, by horizontal directional drilling, from the south-side of the Trans Canada Highway to the new terminal station site. Except for this section the new cables will be installed in the existing ductbank system. The new cable will be Self-Contained Oil-Filled (SCOF) cable similar to the existing cable.

As part of the project scope, new oil-containment facilities will be installed at Newell Substation and the new Hill Avenue Terminal Station. As well, oil stops, oil reservoirs and oil-containment facilities will be installed in the new manholes, in the steep section of the ductbank.

Major construction activity will be focussed on the Hill Avenue Terminal Station site, north of the Trans Canada Highway.

In the summer of 2000 access from Glencarin Road, along B.C. Hydro's right-of-way, will be upgraded in advance of the major construction in 2001. Access upgrades will require improvements to the road, including increasing its width by 4 metres, improving its load-bearing capacity, and replacing or lengthening the culverts at the stream crossings along the route.

Cable replacement in the existing ductbanks will be accomplished in the following stages.

Stage 1: Following the removal of the oil from the cables, the work will involve excavation, at every second manhole, down to the depth of the ductbank (approximately one metre) and about 6 metres in length on either end of the manhole, so that the cables, approximately 200 metres in length, can be pulled straight out using a cable puller. The cables are too stiff to allow them to be pulled up through the top of the manholes. During the removal the cable will be cut up into sections and placed into a disposal bin to contain any oil, which may still remain in the cable. The container will then be transported to a certified disposal site.

Stage 2: Following the removal of the old cables, the ducts will be cleaned and repaired, as necessary, to ensure that new cables can be installed without damage. Residue from the cleaning and repairing of the ducts will be washed through to the manholes and collected there for disposal. While existing manholes will be used wherever possible, some may not be suitable to the new installation, and may need to be modified. Additional manholes may also need to be constructed to accommodate longer cable lengths.

Stage 3: Installation of the new cables will require equipment at both Newell Substation and the Hill Avenue Terminal Station. The cables will be pulled, usually in a downhill direction, from a large cable reel mounted on a flatbed truck. Installation of the new cable will be followed by installation of the cable joints and terminations.

3. ENVIRONMENTAL RESOURCES AND IMPACTS

3.1 VEGETATION AND SOILS

3.1.1 Existing Conditions

The Burnaby Lake Biophysical Inventory undertaken by students from the Fish, Wildlife and Recreation Program at the B.C. Institute of Technology (BCIT 1992) lists 15 habitat types and 12 vegetation types for the Park.

Adjacent to the B.C. Hydro transmission corridor and the Hill Avenue Terminal Station site, the vegetation is primarily comprised of upland forests of contiguous alder/cottonwood, coniferous forests of western hemlock, western red cedar and sitka spruce or mixed conifer-deciduous forests. The terminal station site abuts a low-lying wet area that is contiguous with Burnaby Lake. Vegetation in this area is primarily reed canary grass.

In the area of the Hill Avenue Terminal Station native soils are overlain with a mantle of compact, till-like fill material to a depth of 1 to 2 metres. Below this material are layers of peat, sand and silt to depths up to 11 metres. Further back from the wet fringe of the lake, native till material occurs at depths of about 9 metres. The peat, sand and silt layers tend to be loose, soft and moist.

West, from the terminal station site, along the right-of-way, the soils are similar in composition but the till layers occur at about 6 metres. Peat layers are not present, although organics occur in the sand and silt. The sand and silt layers are loose, soft and moist.

3.1.2 Impacts

As a result of this project no impacts to vegetation and soil are expected. Construction activities will be on unvegetated and previously disturbed areas only, with no tree removal required. Soils under the new terminal station site will be upgraded to improve the seismic withstand of the new terminal station structures. The soil improvement is localized to the immediate footprint area of the new terminal station. If necessary, on site soil remediation of the existing sites will be undertaken.

3.2 WILDLIFE

3.2.1 Existing Conditions

Wetlands, like Burnaby Lake Regional Park, are considered one of the most productive and diverse habitat complexes in temperate North America. The juxtaposition of water and land, wetland and upland, and marsh and forest provides a huge variety of nesting, feeding and seasonal habitat for many species of both vertebrate and invertebrate wildlife. The bird checklist for the regional park documents 212 species of birds from common to rare in these habitats. The 1992 study by BCIT lists 22 species of mammals, 10 amphibians and 5 reptiles. These species are shown in Table A and B.

The habitat along the south shore of Burnaby Lake, between the lake and the Trans Canada Highway is relatively simple and uniform. This area is essentially a riparian habitat because it is influenced by the frequent drainage channels and the lake. Deciduous species; Alder, Cottonwood and Big-leaf Maple dominate the overstory. The shrub layer is composed of Alder, Willow, Red-osier Dogwood, Blackberry and Salmonberry. The forbs layer is poorly developed as a result of the shading primarily from the dense overstory layers. The deciduous overstory is interrupted in places by small clumps of large western Red Cedar and western Hemlock. The ground is quite wet for most of the year and likely too wet for burrowing animals. Mice can live above ground, protected by the woody debris throughout the area. Many species of birds will be found nesting and foraging in the tress, shrubs and on the ground in these habitats.

Within the B.C. Hydro right-of-way, between the treed edge and the Trans Canada Highway, the cover is predominantly blackberry thicket and grasses. This cover type is consistent from Glencarin Road to the Hill Avenue Terminal Station site. The habitat is appropriate for mice and voles and low or ground-nesting birds like the rufous-sided towhee.

The wetland (marshes and wet meadow) habitats abut the B.C. Hydro right-of-way in the area of the Hill Avenue Terminal Station structures. Songbirds, such as the Yellow Warbler, Red-winged Blackbird and Common Yellowthroat, are arguably the most noticeable wildlife component of the Burnaby Lake wetland complex. However, this is also an important habitat for amphibians and mammals as well, and waterfowl will nest in the vegetation along the marsh edges.

Table A: Wildlife species known to occur in the Burnaby Lake area and associated key habitat types.

		Uplands	Riparian	Wetland	Aquatic
Raccoon	*Procyon lotor*		✓	✓	
Douglas Squirrel	*Tamiasciurus douglasi*	✓	✓		
Deer Mouse	*Peromyscus maniculatus*	✓	✓		
Short-tailed Weasel	*Mustela erminea*	✓	✓		
Red Fox	*Vulpes vulpes*	✓	✓	✓	
Muskrat	*Ondatra zibethica*			✓	✓
Striped Skunk	*Mephitus mephitus*	✓	✓		
House Mouse	*Mus musculus*				
Dusky Shrew	*Sorex obscurus*				
Bendire Shrew	*Sorex bendiri*		✓	✓	✓
Townsend's Big-eared Bat	*Corynorhinus townsendii*	✓	✓	✓	
Norway Rat	*Rattus norvegicus*	✓	✓		
Long-tailed Vole	*Microtus longicaudus*	✓	✓		
Varying hare	*Lepus americana*	✓	✓	✓	
Beaver	*Castor canadensis*		✓	✓	✓
Western Jumping Mouse	*Zapus princeps*		✓	✓	
Vagrant Shrew	*Sorex vagrans*		✓	✓	
Townsend's Vole	*Microtus townsendii*	✓	✓		
Northern Flying Squirrel	*Glaucomys sabrinus*	✓	✓		
Bushy-tailed Woodrat	*Neotoma cinerea*	✓	✓	✓	
Coyote	*Canis latrans*	✓	✓	✓	
Eastern Cottontail	*Sylvilagus floridanus*	✓	✓		

Table B: Wildlife species known to occur in the Burnaby Lake area and associated key habitat types.

		Uplands	Riparian	Wetland	Aquatic
Amphibians and Reptiles					
Western Long-toed Salamander	*Ambystoma macrodactylum*		✓	✓	✓
Ensatina	*Ensatina escholtzi*	✓	✓		
Western Red-backed Salamander	*Plethodon vehiculum*	✓	✓		
Northwestern Salamander	*Ambystoma gracile*		✓	✓	✓
Pacific Coast Newt	*Taricha granulosus*		✓	✓	✓
Northwestern Toad	*Bufo boreas boreas*		✓	✓	✓
Pacific Tree Frog	*Hyla regilla*		✓	✓	
Pacific Tarrapin	*Clemmys marmorata*	extirpated in BC			
Green Frog	*Rana clamitans*		✓	✓	✓
Red-legged Frog	*Rana aurora aurora*	✓	✓	✓	✓
Bullfrog	*Rana catesbeiana*		✓	✓	✓
Northwestern Garter Snake	*Thamnophis ordinoides*	✓	✓		
Wandering Garter Snake	*Thamnophis elegans vagrans*	✓	✓	✓	
Common Garter Snake	*Thamnophis sirtalis pickeringi*	✓	✓	✓	
Painted Turtle	*Chrysemys picta*			✓	✓

3.2.2 Impacts

Impacts to wildlife, as a consequence of this project, are not expected to be significant. Activity will be restricted to sites that are currently occupied by B.C. Hydro's facilities, or are already significantly disturbed and do not currently provide wildlife habitat. An exception to this may be the replacement of culverts and the temporary dewatering of sections of creeks during construction. Dewatering may impact animals other than fish, such as small mammals and amphibians, mollusks and other invertebrates but these impacts are expected to be minor as the dewatering will be for a short duration only.

3.3 FISHERIES

3.3.1 Existing Conditions

There are numerous creeks tributary to the Burnaby Lake/Brunette River system. Key tributary creeks, from a fishery perspective include: Deer Creek that drains Deer Lake, south and east of Burnaby Lake; Robert Burnaby Creek that drains the slopes of Robert Burnaby Park, south of Burnaby Lake; and Eagle Creek that drains the slopes to the north of Burnaby Lake. In addition to these creeks, there are numerous small creeks and ditches that are tributary to Burnaby Lake, on both the north and south sides of the lake.

There is one species of fish, the Brassy Minnow (*Hybognathus hankinsoni*) that occurs in the Brunette River and is "Blue-Listed in the province.[1] Other fish species recorded for the Burnaby Lake/Brunette River system includes: Coho Salmon, Rainbow Trout, Cutthroat Trout, Carp, Three-Spined Stickleback, Prickly Sculpin, Brown Bullhead and Northern Squawfish.

The Department of Fisheries and Oceans *Fish Inventory Systems Summary* (FISS) has listed Cutthroat Trout, Coho, Chum and Chinook for the Brunette River system and has a record for Dolly Varden in the Brunette River system.

Historically, the Burnaby Lake/Brunette River system provided high quality spawning and rearing habitats for salmonids. Currently, high summer water temperatures, low levels of dissolved oxygen and pollution loads have seriously reduced the suitability of this system for salmonids, including Rainbow and Cutthroat Trout, Coho, Chum and Chinook.

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[1] *Cannings,S.G. and J. Ptolemy. 1998. Rare Freshwater Fish of British Columbia. BC Env. Victoria, BC*

The FISS database has recorded 42 occasions where summer water temperatures in Burnaby Lake have exceeded tolerable levels for salmon and trout. As well, heavy metals, nutrients and organic waste have exceeded established criteria for the protection of aquatic life. The FISS identifies Deer Creek as the source of nutrient loadings from runoff and sewage effluent that has increased the lakes biological oxygen demand and eutrophication.

High summer water temperatures and low dissolved oxygen limit the Brunette River suitability. Salmon production in Still Creek is limited by low dissolved oxygen, pollution, and siltation and has been impacted by numerous spills. Heavy pollution in the creek is a result of industrial development and it's proximity to major transportation arteries.

The small creeks that are tributary to Burnaby Lake along the south side provide reasonable habitat and, downstream of the Trans Canada Highway, are rated as Class A habitat[2]. On some of the creeks, upstream habitat is generally blocked by culverts that carry the creek under the Trans Canada Highway. Where the culverts are accessible the upstream habitat is rated as Class A or A/O. Robert Burnaby Creek provides rearing spawning and habitat for Coho and Cutthroat on both sides of the highway, although culverts at the B.C. Hydro access road and the Trans Canada Highway may be impassable during low water conditions.

3.3.2 Impacts

Access construction will include the replacement of seven culverts and modifications (extensions) to two others. Culvert replacement will require complete excavation to remove the existing culvert, temporary damming and redirection of any flows past the work area and, in some cases re-grading of the creek bed to accommodate the new culvert. All replacement culverts will be approximately 10 metres in length to accommodate the wider roadbed and will comprise "D" type fish culverts that can readily accommodate the addition of natural stream substrate to the culvert .

During culvert replacement, portions of the creeks will have to be dewatered. This will allow work to proceed under dry conditions and will reduce downstream sediment loads. It will also reduce the availability of habitat and access to stream reaches upstream of the culvert for the short period of culvert replacement.

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[2] *ECL Envirowest Consultants Ltd. 1996. Trans-Canada Highway H.O.V. Lanes City of Vancouver to City of Coquitlam Fisheries Resource Inventory. Envirowest.*

3.4 VISUAL AND RECREATION

3.4.1 Existing Conditions

Burnaby Lake Regional Park is a significant recreational asset in the Lower Mainland. At the west-end of the park is the Burnaby Lake Sports Complex, which is the site of many major sporting and recreational events. As well as the sports complex, an ice rink, swimming pool and rowing pavilion is located at the west-end of the park. At the east-end of the park are the stables of the Burnaby Equestrian Centre and the park office.

Recreational activities include walking and jogging (approximately 10 kilometres of trails) as well as canoeing and rowing. Other activities include nature study and birdwatching. In protecting the public's recreational experience in the Burnaby Lake area it will be important to protect as much of the original landscape as possible, and particularly those landscape components that screen the park users views of the Trans Canada Highway and the transmission facilities.

There is a small, "semi-rural" neighbourhood along parts of Sperling Avenue and Glencarin Drive at the west-end of Burnaby Lake Park. Also in this area at the east-end of the neighbourhood are the Wildlife Rescue Association facilities. Both Sperling Avenue and Glencarin Drive are narrow, winding roads, canopied in places by roadside vegetation.

On the south-side of the Trans Canada Highway the transmission right-of-way cuts through Robert Burnaby Park and the neighbourhoods east of Canada Way, and along Imperial Avenue before terminating at Newell Substation.

3.4.2. Impacts

Construction activity to upgrade the access road into the Hill Avenue Terminal Station site will result in restricted access along approximately two kilometres of the existing trail under the transmission lines west of the terminal station site. During the summer of 2000, access construction, including upgrading of the stream crossings is expected to take about 3 months. During that time the access road west of the terminal station may only be available on weekends and during the evening, after construction has ceased for the day. Trails along the lake will still be accessible to walkers and joggers, however horseback riding will be restricted to the designated trails east of the terminal station site.

In order to facilitate construction of the new terminal station, parts of the existing trail network in the immediate vicinity of the terminal station site will be reconfigured. This reconfiguration will see the trail, which is currently routed between the two existing terminal structures, moved away from the terminal area toward the lake. This will be a permanent re-routing and will move public activity a safe distance from the construction activity and the new terminal station site.

Heavy equipment traffic during the upgrading of the access road and construction of the terminal station site will result in major noise and disturbance along Sperling Avenue and Glencarin Road.

Construction activity around the removal and replacement of the cables will generally be concentrated at the existing manhole locations along the route. New manholes may be required to accommodate the new cables, however it is likely that these can be located away from any neighbourhood areas to minimize disturbance.

3.5. HERITAGE AND ARCHEOLOGY

3.5.1 Existing Conditions

There are no record of heritage or archaeological resources existing in the area defined by the project. The transmission corridor along the Trans Canada Highway, west of the terminal station site follows the old interurban rail grade, however this has long since been disturbed to the point where it has no historical significance. The entire area north of the Trans Canada Highway surrounding Burnaby Lake represents infill of a once larger lake. The likelihood of archaeological resources in this area is remote.

On the south-side of the Trans Canada Highway the construction work will be contained within the existing right-of-way and essentially confined to the ductbank system located within the right-of-way. Disturbance of the ground outside of the immediate area around the ductbank is not anticipated. As such, if historical resources exist in Robert Burnaby Park, or in parts of the neighbourhoods along the route, there is little likelihood that these resources will be disturbed.

3.5.2 Impacts

No Impacts to heritage or archaeological resources are anticipated for this project.

4. SUMMARY OF ENVIRONMENTAL IMPACTS

The impacts to the natural and social environment, arising from this project are not expected to be significant. There will be some moderate impacts[3] to recreational users of the Burnaby Lake Regional Park, as a result of construction activities, but these are expected to be short-term. The majority of the work, along the underground cable route, will be within the existing right-of-way and will not involve ground disturbance except in discrete locations. Again, with this phase of the work the greater impacts will be associated with construction activity and disturbance of the social environment. These will also be short-term impacts isolated to a few locations along the underground transmission route.

Impacts to the natural environment, which result from the replacement of the terminal station, are expected to be modest and mitigable. Construction of the new station will have limited impact to the natural environment, those impacts will be contained within the existing B.C. Hydro right-of-way, and fee owned property. Most of this area has been previously disturbed and, with the exception of the riding/walking trail, does not represent a significant environmental resource. The riding/walking trail will be permanently relocated away from the construction area and the new terminal station site. Access to the trails along the transmission corridor west of the site will be restricted during construction, but may be open during evenings and weekends.

Cable replacement work within the Burnaby neighbourhoods and the area around Newell Substation will result in some impediments to traffic. Minimal impacts are expected on regular commuter traffic.

Construction is scheduled to occur between the months of March and October, and during the summer months will likely take advantage of the longer daylight period. While noise levels will not be extreme it will result in some nuisance level for residents in the immediate vicinity. Construction activity in the locations where new manholes may be constructed will be greater than other sections of the right-of-way because of the need to use excavators and concrete trucks. This source of noise will be of relatively short duration.

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[3] ***Low*** *- Impacts of the proposed project would not result in discernable changes to the resource value. Measures to mitigate these impacts are likely available and would be applied.*
Moderate *- The proposed project would result in discernable changes to the resource value. Some impacts may remain after mitigation measures have been applied.*
High *- The proposed project would result in significant impacts to the resource value. These impacts are difficult to resolve through mitigation and /or may eliminate the resource altogether*

5. MITIGATION

The short-term impact that construction activity will have on recreational users of the riding trails of Burnaby Lake Regional Park is a result of safety concerns. Horseback riders and construction traffic cannot safely co-exist on the access road. For this reason the access road will be closed for recreational use during the daytime hours of construction; however, the road will be available during evening hours and weekends. The exact times of the restrictions may change depending on the construction schedule. The loss of the riding trail through the present terminal station site will be completely offset by its relocation to the north, away from the area of construction and the future terminal station site.

The right-of-way on the south-side of the Trans Canada Highway, through Robert Burnaby Park, will be the site of some construction activity when the existing cables are removed and the manholes are upgraded or replaced. This area is part of a leash-free dog walking area and is quite popular with the local residents. As with the access road construction, on the north-side of the highway, public access to this right-of-way will have to be restricted during the construction period. However, the construction site will be secured with safety fencing to ensure safe use during off-hours.

Away from the park areas, construction activity will be limited to removal and replacement of the underground cables and, possibly the addition of one or two new manholes. This activity will be concentrated within the right-of-way and focussed on the manhole sites between Newell Substation and Canada Way. There should be very little direct exposure of the public to construction activity along this section. Nuisance noise will be a problem for those residents near the construction locations. However, these impacts will be discontinuous and of short duration. As well, construction will not carry through into the evening hours which should lessen the impact in these neighbourhoods.

Work on the access into the terminal station site, on the north side of the Trans Canada Highway, for construction equipment will require upgrading of a number of creeks and drainage channels along the right-of-way. Impacts to these aquatic and riparian systems is not expected to be significant as the work, primarily culvert replacement or extension, will be carried out during the late summer low flow period. Late summer is also a time when the likelihood of impacts to fish is low and any other aquatic vertebrates will be sufficiently developed to be able to avoid the impacted area or survive the required temporary dewatering of a short section of the creek.

For most of the creeks, work will involve dewatering and removal/replacement of the culverts. The new culverts will be about 2 metres longer than the existing culverts and will be "D" shaped, requiring some contouring of the creek bed. For Robert Burnaby Creek, the existing culvert is suspended, on wood cribbing, at the outlet above the grade of the creek. This poses a barrier to fish movement and will be rectified with the new culvert.

However, in order to correct this situation, the new culvert will have to be placed lower, and portions of the creek, up to the highway culvert, recontoured to accommodate the new culvert without creating extreme gradients. A detailed design of the proposed work on Robert Burnaby Creek is being prepared for review and approval by the Department of Fisheries and Oceans (DFO) and by the Ministry of Environment, Lands and Parks. The completed work will remove any existing barriers to fish passage while maintaining the creek at less than the maximum gradient that is navigable by juvenile Cutthroat Trout.

6. KEY STAKEHOLDER LIAISON

During the project definition phase of the project, B.C. Hydro undertook consultation with key agency stakeholders, such as: the City of Burnaby, the Ministry of Transportation and Highways, the Greater Vancouver Regional District (GVRD), and the Ministry of Environment, Lands and Parks. Their input and comments, with respect to the options outlined above assisted B.C. Hydro in identifying many of the issues that the project would have to address and the preferred configuration for the new Hill Avenue Terminal Station facilities. The following table summarizes the key comments and concerns that were received in regard to the selection of the new Hill Avenue Terminal Station site.

	City of Burnaby	GVRD	MOTH	MOELP
Option 1	• Additional right-of-way required for overhead line in Burnaby Lake Park. • Visual impact of additional overhead lines. • Significant concerns with proximity to the Robert Burnaby Creek.	• Additional right-of-way required for overhead line in Burnaby Lake Park. • Visual impact of additional overhead lines. • Significant concerns with proximity to the Robert Burnaby Creek. • Will impact on existing park trails. • Significant concerns with proximity to GVRD watermain.		• New terminals are too close to the Robert Burnaby Creek. • Concerns about vegetation removal near Burnaby Lake Park.
Option 2	• Acceptable. • Stations should be constructed close together to minimize the overall site.	• Acceptable. • Recommend vegetation screening of the new station to minimize visual impacts.		• Remain as close as possible to the existing site.
Option 3	• Additional right-of-way required for overhead line in Burnaby Lake Park, including vegetation removal.	• Additional right-of-way required for overhead line in Burnaby Lake Park, including vegetation removal.	• Permit required for the new underground crossing of the Trans Canada Highway.	• Similar concerns to Option 1.
Option 4	• Not recommended. • Additional right-of-way required for overhead line in Burnaby Lake Park, including extensive vegetation removal. • Visual impact of additional overhead lines. • Not in close proximity of existing site.	• Not recommended. • Additional right-of-way required for overhead line in Burnaby Lake Park, including extensive vegetation removal • Visual impact of additional overhead lines. • Not in close proximity of existing site.	• Permit required for the new underground crossing of the Trans Canada Highway.	• Concerns about substantial vegetation removal near Burnaby Lake.
Option 5	• Not recommended. • Very high visual impact of overhead lines crossing the Trans Canada Highway. • Impact of new terminal station in Robert Burnaby Park.	• Not recommended • Very high visual impact of overhead lines crossing the Trans Canada Highway. • Impact of new terminal station in Robert Burnaby Park.	• Permit required for the new overhead crossing of the Trans Canada Highway. • Expressed concerns about potential impacts on highway traffic due to line maintenance.	• Concerns about vegetation removal in Robert Burnaby Park.

7. RECOMMENDATIONS

This report summarizes environmental issues that led to the selection of a preferred site for the new Hill Avenue Terminal Station. It also addresses environmental issues associated with the replacement of the deteriorated underground cables between Newell Substation and the Hill Avenue Terminal Station. While the environmental impacts are moderate, management of these impacts will be the focus of future work as the project progresses towards the construction phase. Environmental Management Plans will be prepared for the construction of the access road in summer 2000, and for construction of the Hill Avenue Terminal Station, and the replacement of the underground cables in 2001 and 2002.

A separate Environmental Management Plan, to manage impacts associated with culvert replacement and stream improvements, will be prepared in consultation with DFO and MOELP. This plan should support B.C. Hydro's application for approval to work under Section 9 of the B.C. Water Act.

8. REFERENCES

1. British Columbia Institute of Technology. 1992. Burnaby Lake Biophysical Inventory - Summer 1992. BCIT Fish, Wildlife and Recreation Program.

2. British Columbia Institute of Technology. 1992. Burnaby Lake Biophysical Inventory - Fisheries Inventory. BCIT Fish, Wildlife and Recreation Program.

3. British Columbia Institute of Technology. 1992. Burnaby Lake Biophysical Inventory - Water Quality Study. BCIT Fish, Wildlife and Recreation Program.

4. British Columbia Institute of Technology. 1992. Burnaby Lake Biophysical Inventory - Coliform Analysis. BCIT Fish, Wildlife and Recreation Program.

5. Burnaby Lake Regional Park. Bird Checklist.

6. ECL Envirowest Consultants Ltd. 1996. Trans Canada Highway H.O.V. Lanes - City of Vancouver to City of Coquitlam - Fisheries Resource Inventory. Report prepared for MOTH, Victoria.

7. Cannings,S.G. and J. Ptolemy. 1998. Rare Freshwater Fish of British Columbia. BC Env. Victoria, BC.